

IMP8139



INDUSTRIAL NOISE IMPACT ASSESSMENT

PROPOSED KITCHEN VENTILATION SYSTEM

British Standard 4142:2014+A1:2019



Client:	AVE Ltd
Site:	97-99 Montague Street, Worthing, West Sussex, BN11 3BN
Survey Date:	29th April - 4th May 2026
Report by:	I.Broom AMIOA

1	EXECUTIVE SUMMARY	5
1.1	INSTRUCTION	5
1.2	SCOPE OF REPORT.....	5
1.3	SUMMARY OF REPORT	6
1.3.1	<i>Measured Background Noise Levels.....</i>	6
1.3.2	<i>Criterion</i>	6
1.4	PLANT SOURCE LEVELS.....	7
1.5	ASSESSMENT SUMMARY.....	7
1.6	CONCLUSIONS	8
2	CRITERION	9
2.1	PLANNING AND POLICY CONTEXT	9
2.2	BRITISH STANDARD 4142:2014+A1:2019	10
2.3	ADOPTED CRITERION FOR THIS REPORT	10
3	SITE LOCATION.....	11
4	APPARATUS AND MEASURED BACKGROUND NOISE LEVELS	13
4.1	INSTRUMENTATION	13
4.2	BACKGROUND NOISE MEASUREMENT POSITION	13
4.3	MEASUREMENT RESULTS.....	14
4.3.1	<i>Daily Summary - 07:00-23:00.....</i>	14
5	OPERATION OF SITE AND SOURCE LEVELS.....	15
5.1	PROPOSED KITCHEN EXTRACT SYSTEM	15
5.2	SOURCE SOUND POWER LEVELS.....	15
5.3	CHARACTER CORRECTION	15
6	CALCULATION METHODOLOGY	16
6.1	SOURCE DIRECTIVITY	16
6.2	GEOMETRIC DIVERGENCE	16
6.3	LOGARITHMIC ADDITION	16
7	CALCULATIONS AND ASSESSMENT.....	17
7.1	UNMITIGATED DISCHARGE NOISE	18
7.2	UNMITIGATED FAN CASING / BREAKOUT NOISE.....	18
7.3	UNMITIGATED COMBINED ASSESSMENT	19
7.4	ACCUMULATIVE UNMITIGATED COMPONENT ASSESSMENT	20
7.5	REQUIRED MITIGATION FOR PROPOSED DAYTIME/EVENING OPERATION	20
7.6	MITIGATED COMPONENT ASSESSMENT	21
8	RECOMMENDED MITIGATION SPECIFICATION	22
8.1	SUGGESTED PLANNING / COMPLIANCE CONDITION WORDING	22
9	COLOUR-CODED BS4142 ASSESSMENT SUMMARY.....	23
10	CONCLUSIONS.....	24

10.1	UNCERTAINTY	24
11	APPENDIX A - HOURLY BACKGROUND DATA.....	25
12	APPENDIX B - INFORMATION TO BE REPORTED	29
13	APPENDIX C - CHARACTER CORRECTION	30
14	APPENDIX D - UNCERTAINTY BUDGET	31
15	APPENDIX E - CALCULATION METHODOLOGY AND PROPAGATION ASSUMPTIONS	33
15.1	ASSUMPTIONS AND INPUT CRITERIA	33
16	APPENDIX F - MANUFACTURER DATA AND MITIGATION DETAILS.....	35
16.1	DRAWING DATA, CALCULATION INPUT STATUS AND CONFIRMATION REQUIREMENTS.....	35
16.2	STARTING SOURCE/INPUT OCTAVE-BAND SCHEDULES USED IN THE ASSESSMENT	36
16.3	MINIMUM OCTAVE-BAND MITIGATION SCHEDULES USED IN THE ASSESSMENT	36
16.4	DRAWING EXTRACT - ATTENUATOR LOCATION AND BENCHMARK REQUIREMENT	37
16.5	FAN CASING / SCREEN CONSTRUCTION REQUIREMENT	43
17	APPENDIX G - CITATIONS AND REFERENCES.....	44
18	DISCLAIMER	45

Version History

Version	Date	Author	Summary of Changes
1.0	May 2026	I Broom aMIOA	Initial issue

1 EXECUTIVE SUMMARY

1.1 Instruction

Impact Acoustics Ltd have been instructed to prepare a noise impact assessment for the proposed kitchen ventilation/extract arrangement serving 97-99 Montague Street, Worthing, West Sussex, BN11 3BN. The assessment has been prepared to support the proposed kitchen ventilation layout shown on AVE Ltd drawing C7103-DW-00-001 P01 and to provide a BS 4142:2014+A1:2019 assessment of potential impact at the nearest residential receptor.

1.2 Scope of Report

The assessment considers both the proposed EF.01 kitchen extract system and the associated fresh-air intake/supply path shown on the ventilation drawing. The assessment includes airborne terminal noise, fan casing/breakout noise, exposed duct breakout noise, duct length attenuation, bend/section effects, regenerated-noise allowances, end reflection loss, directivity/reflection correction, geometric divergence and logarithmic summation of all relevant paths. Manufacturer octave-band data have been used for the selected extract and fresh-air fans, with the supplied AMS Type R2 1200 mm attenuator insertion loss used for the terminal mitigation. Final installed duty points, ductwork construction, transitions, installation details and contractor selections should be checked against the performance requirements in this report before installation.

- Measured daytime and evening background noise levels at a position representative of the nearest residential receptor. No night-time kitchen extract / plant operation is proposed or assessed;
- Assessment of unmitigated discharge noise from the proposed kitchen ventilation system;
- Assessment of fan casing/breakout noise from the roof-mounted EF.01 fan/plant item;
- Logarithmic combination of relevant plant noise contributions at the nearest noise sensitive property;
- Specification of mitigation where required, including octave-band attenuator and casing/screening performance requirements;
- Identification of post-installation verification requirements.

1.3 Summary of Report

1.3.1 Measured Background Noise Levels

Continuous environmental sound measurements were undertaken between 29th April and 4th May 2026. The data have been reviewed as 15-minute records and grouped into complete one-hour periods for the BS 4142 assessment. The adopted normal operating design criterion is the evening representative background level of 44 dB LA90,1h during 19:00-23:00, because this is the controlling representative background level during the proposed operating period. No kitchen extract / plant operation during 23:00-07:00 is proposed or assessed in this report.

Assessment period	Number of complete hours	Representative background LA90,1h	Comment
Daytime 07:00-19:00	56	48 dB	Typical daytime period; urban road/commercial activity is dominant.
Evening 19:00-23:00	20	44 dB	Controls normal evening operation; modal/median data support adoption.
Adopted design period	20	44 dB	Evening period adopted as the controlling normal operating criterion.

1.3.2 Criterion

The assessment has been undertaken on the basis that the proposed kitchen ventilation plant should be designed so that the rating level does not exceed the representative background sound level at the nearest noise sensitive receptor. Because no night-time kitchen extract operation is proposed, the design assessment has been undertaken for the daytime/evening operating period only. For robustness, a +5 dB BS 4142 character correction has been allowed at the design stage. The controlling evening design target is therefore a calculated plant specific level not exceeding 39 dB LAeq,T, which gives a maximum rating level of 44 dB LAr,Tr after the +5 dB character correction.

Period	Adopted LA90,1h background	Design character correction	Maximum design specific level	Maximum rating level
07:00-19:00	48 dB	+5 dB	43 dB	48 dB
19:00-23:00	44 dB	+5 dB	39 dB	44 dB
Adopted design criterion	44 dB	+5 dB	39 dB	44 dB

1.4 Plant Source Levels

The proposed system has been assessed as two ventilation systems: the kitchen extract system and the fresh-air intake/supply system. The drawing identifies roof/rear elevation plant, ductwork, attenuation and bird-beak/weather-louvre type terminals. The selected plant comprises a Systemair MUB 062 630D4 Multibox for the kitchen extract duty and a Systemair MUB 062 560D6 Multibox for the fresh-air intake/supply duty. Manufacturer octave-band sound power data have been used for the extract discharge, extract fan casing, fresh-air terminal and fresh-air fan casing paths. The R2 1200 mm attenuator static insertion loss has been used as the specified terminal attenuation. Final installed fan duty points and ductwork/attenuator selections must be confirmed by the mechanical contractor before installation.

Octave band, Hz	63	125	250	500	1000	2000	4000	8000	A-weighted total
Extract outlet Lw dB(A)	60	80	83	86	88	84	81	73	92.0
Extract casing Lw dB(A)	39	63	54	53	56	55	47	37	65.0
Extract duct internal level	60	80	83	86	88	84	81	73	92.0
Fresh-air terminal Lw dB(A)	48	67	68	70	71	70	65	59	77.0
Fresh-air casing Lw dB(A)	28	51	41	38	41	42	32	24	52.0
Fresh-air duct internal level	48	67	68	70	71	70	65	59	77.0

1.5 Assessment Summary

Scenario	Specific level at receptor	Rating level with +5 dB character correction	Difference versus 44 dB evening criterion	Outcome	
Unmitigated combined extract + fresh-air + duct/fan breakout	60.0 dB	65.0 dB	+21.0 dB	Mitigation required	
Mitigated with R2 1200 mm terminal attenuation + casing/duct breakout treatment	37.8 dB	42.8 dB	-1.2 dB	Low impact / below or broadly at background	
Post-installation verification	To be measured	To be confirmed	Must not exceed background	Verification survey required	

1.6 Conclusions

The unmitigated combined kitchen extract and fresh-air intake/supply arrangement is predicted to exceed the adopted daytime/evening background criterion at the nearest residential receptor. Mitigation is therefore required. For operation during the proposed operating period, the system should incorporate the discharge/intake attenuation, fan casing/screening and duct breakout treatment specified in this report. No kitchen ventilation operation during 23:00-07:00 is proposed or assessed.

Subject to the mitigation measures and verification requirements set out in this report, the proposed system can be designed to satisfy the adopted BS 4142 criterion and to avoid significant adverse impact at the nearest residential receptor.

2 CRITERION

2.1 Planning and Policy Context

The site comprises 97-99 Montague Street, Worthing, West Sussex, BN11 3BN. The proposal relates to a kitchen ventilation/extract arrangement serving a mixed commercial/residential premises in Worthing town centre. The drawing information identifies external/rear elevation ventilation plant, including carbon filtration, roof-mounted Systemair fan plant, flexible connections, attenuator sections, exposed ductwork and terminal arrangements. The nearest noise sensitive receptor has been identified from the supplied annotated aerial imagery as the adjacent residential receptor to the west/south-west of the proposed plant/discharge arrangement.

The planning and assessment objective is to demonstrate that the proposed commercial plant can operate without giving rise to unacceptable noise pollution, significant adverse impact or unreasonable loss of amenity at the nearest residential receptor. The evening part of the normal operating period has been treated as the controlling assessment period because the measured background sound levels reduce after the daytime period.

National planning policy is set by the National Planning Policy Framework (NPPF). The current NPPF states that planning policies and decisions should prevent new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution. The NPPF also requires planning decisions to avoid noise giving rise to significant adverse impacts on health and quality of life, and to mitigate and reduce to a minimum other adverse impacts arising from noise, including through the use of conditions where appropriate.

The Government's Planning Practice Guidance for noise uses the noise exposure hierarchy and the concepts of No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL), Significant Observed Adverse Effect Level (SOAEL) and Unacceptable Adverse Effect Level (UAEL). For this assessment, the proposed design objective is to control the BS 4142 rating level to no greater than the representative background sound level at the nearest receptor. This is considered an appropriate planning-stage criterion for avoiding significant adverse impact and for reducing adverse impact to a low level in the context of BS 4142.

The adopted Worthing Local Plan 2020-2036 is also relevant. Policy DM22 - Pollution requires development not to contribute to, be put at risk from, or be adversely affected by unacceptable levels of pollution, including noise pollution. It further requires mitigation where development could increase levels of pollution and recognises that significant increased pollution that cannot be mitigated may justify refusal. Policy DM5 - Quality of the Built Environment is also relevant insofar as development should protect neighbouring amenity and respond appropriately to its surroundings.

Adur & Worthing Councils' Noise and Planning guidance states that noise impact is taken into account when planning applications are reviewed, and that applications should avoid significant adverse impacts on health and quality of life, mitigate and minimise adverse impacts, and where possible contribute to improved health and quality of life. The Council also refers applicants to the Planning Noise Advice Document: Sussex (November 2023), which identifies industrial/commercial sound as an assessment category and expects calculations and assumptions to be fully presented and justified so that the reader can audit the assessment from the information provided.

The proposed kitchen extract and fresh-air intake/supply systems are commercial plant sources. The assessment has therefore been undertaken using BS 4142:2014+A1:2019, supported by octave-band propagation calculations, measured background sound data, source-specific plant data, mitigation schedules and a post-installation verification requirement. This approach provides a policy-led and standards-based test of whether the proposed plant can be integrated without unacceptable noise impact.

2.2 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 provides methods for rating and assessing sound of an industrial and/or commercial nature. Kitchen ventilation plant noise from a premises is commercial sound and falls within the scope of the Standard. The assessment compares the rating level of the specific plant sound with the representative background sound level at the noise sensitive receptor. The rating level is the specific sound level plus any correction for acoustic character such as tonality, impulsivity, intermittency or other distinctive characteristics. BS 4142 advises that an excess of around +10 dB or more is likely to be an indication of significant adverse impact, depending on context, while an excess of around +5 dB is likely to be an indication of adverse impact, depending on context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact.

Difference between rating level and background	BS 4142 indication
Around +10 dB or more	Indication of a significant adverse impact, depending on context.
Around +5 dB	Indication of an adverse impact, depending on context.
The lower the rating level is relative to the background level	The less likely it is that the specific sound source will have an adverse impact.

2.3 Adopted Criterion for this Report

Period	Adopted background LA90,1h	Low impact / Council design criterion	Adverse indication	Significant adverse indication
Day 07:00-19:00	48 dB	<=48 dB rating level	approx. 53 dB	approx. 58 dB
Evening 19:00-23:00	44 dB	<=44 dB rating level	approx. 49 dB	approx. 54 dB
Adopted controlling criterion	44 dB	<=44 dB rating level	approx. 49 dB	approx. 54 dB

The adopted planning assessment criterion is that the calculated BS 4142 rating level from the proposed plant should not exceed the representative background sound level at the nearest noise-sensitive receptor. This equates to a maximum rating level of 44 dB LA_{r,T} during the controlling evening period and, allowing for a conservative +5 dB character correction at the design stage, a maximum design specific level of 39 dB LA_{eq,T}. As no night-time kitchen ventilation operation during 23:00-07:00 is proposed, this report applies the criterion to the daytime/evening operating period only.

3 SITE LOCATION

97-99 Montague Street is a mixed commercial/residential premises within Worthing town centre. The surrounding acoustic environment is urban in character and is influenced by road traffic, parking/manoeuvring activity, commercial uses at ground-floor level, pedestrian activity and residential uses above/nearby. The nearest noise-sensitive receptor is the residential receptor identified on the supplied annotated aerial imagery, immediately opposite/across the rear service area from the proposed ventilation plant. The contextual sensitivity is increased by the short source-receptor separation, the elevated/rear facade relationship and the potential for fan/duct noise to be more noticeable during the evening when general urban activity reduces.

The proposed ventilation layout identifies separate kitchen extract and fresh-air intake/supply ductwork, roof/rear elevation plant, attenuator sections and external terminals. The annotated aerial measurements indicate source-receptor distances of approximately 10.00 m to the closest roof plant/duct route, approximately 10.65 m to the closest terminal path and approximately 15.34 m to the second terminal path. These distances have been adopted for the separate octave-band path calculations and no beneficial screening has been relied upon.

The assessment is based on AVE Ltd drawing C7103-DW-00-001 P01, issued for approval on 19.05.2026. The drawing identifies the proposed kitchen ventilation layout, including the extract/fresh-air duct routes, plant location and attenuation arrangement. The adopted source-receptor distances and assessment path categories are taken from the drawing and supplied annotated aerial imagery.

Element	Adopted distance to nearest receptor	Assessment note
Extract terminal	10.65 m	Assessed as airborne terminal/discharge noise including duct attenuation, bends, end reflection and directivity.
Extract fan casing / breakout	10.00 m	Assessed separately as roof/rear plant casing breakout.
Extract duct breakout	10.00 m	Assessed as breakout from exposed external duct route.
Fresh-air terminal	15.34 m	Assessed as separate fresh-air terminal/intake path.
Fresh-air fan casing / breakout	10.00 m	Assessed separately as casing/breakout from supply/fresh-air fan path.
Fresh-air duct breakout	10.00 m	Assessed as breakout from exposed fresh-air duct route.
Combined plant level	Logarithmic sum	Combined from all extract and fresh-air terminal, fan and duct breakout paths.



Figure 1: Supplied annotated aerial image showing the nearest sensitive receptor and the source-receptor distance paths used for the assessment.

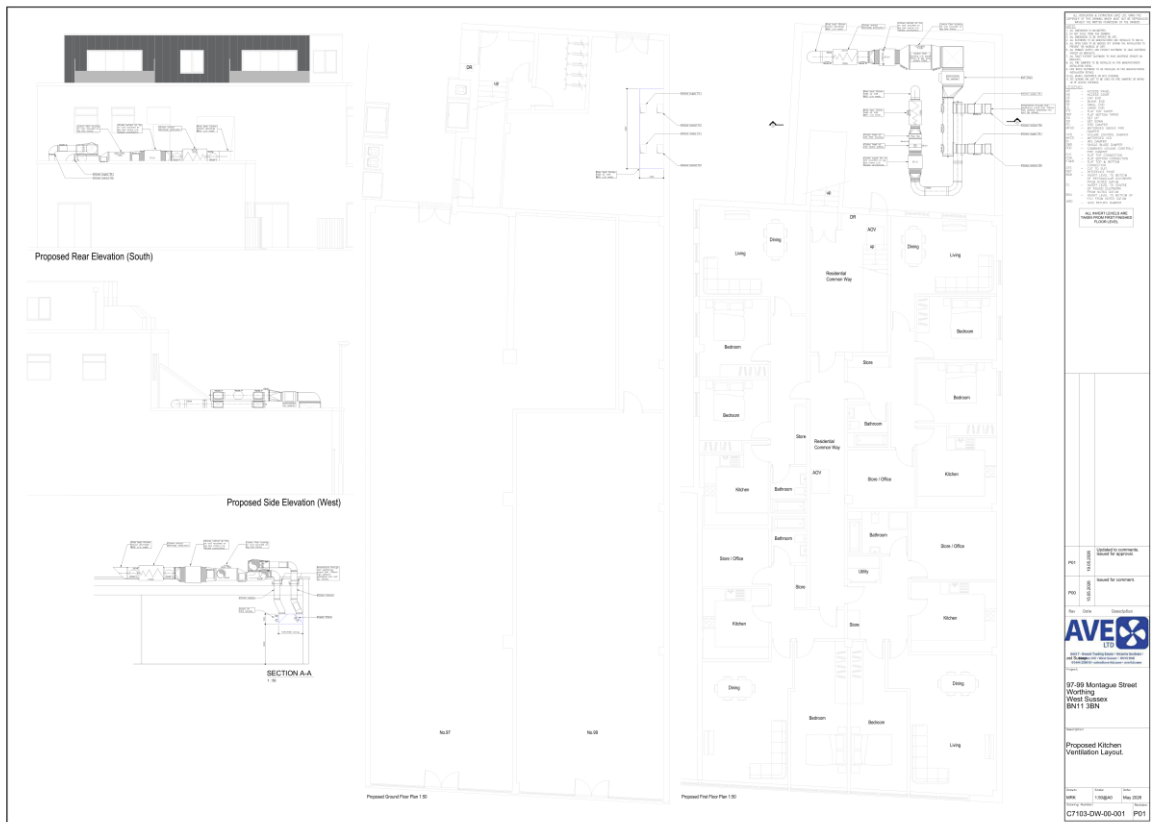


Figure 2: Proposed kitchen ventilation layout drawing C7103-DW-00-001 P01 showing the roof-mounted kitchen extract and fresh-air arrangement.

4 APPARATUS AND MEASURED BACKGROUND NOISE LEVELS

4.1 Instrumentation

The following equipment information has been retained from the Impact Acoustics measurement record for the project template. Calibration certificates are available upon request. The meter was calibrated before and after the measurement period and no significant calibration drift was recorded.

Description	Make	Type	Serial No.	Calibration interval	Last calibrated	Next due
Integrated Sound Level Meter	Norsonic	118	31632	2 years	01.05.2025	01.05.2027
12.5 mm Microphone with windshield	Norsonic	1225	91720	2 years	01.05.2025	01.05.2027
Microphone Pre-Amplifier	Norsonic	1201	29307	2 years	01.05.2025	01.05.2027

4.2 Background Noise Measurement Position

The background sound measurement position is shown in Figure 3. The measurement position is identified by the blue marker on the supplied aerial image. The nearest sensitive receptor is identified by the yellow marker. The position was selected as an equivalent representative location for the receptor because local road traffic and town-centre activity dominate the residual acoustic environment. The measurement position is not immediately adjacent to the proposed extract discharge and therefore avoids direct contamination from the source under assessment. This approach provides a representative equivalent background position for the nearest receptor while avoiding contamination from the plant under assessment.

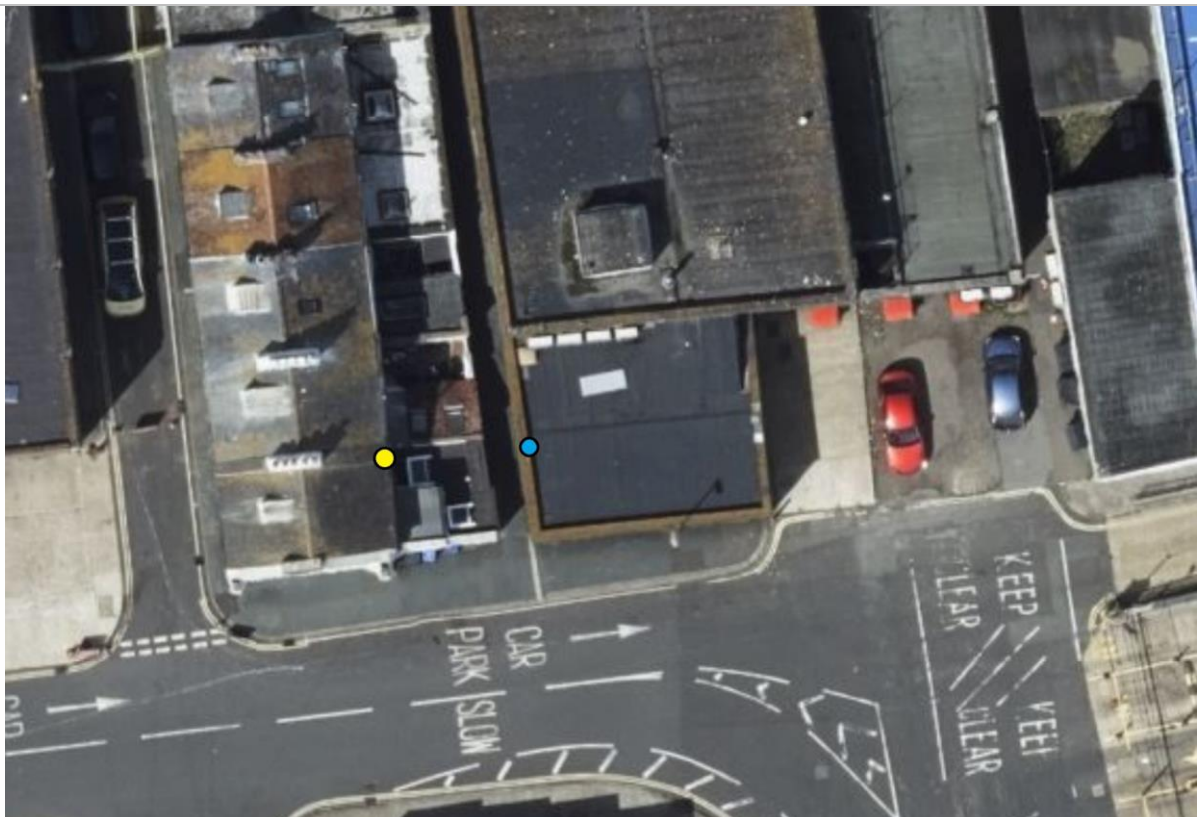


Figure 3: Background noise measurement position and nearest sensitive receptor. The blue marker identifies the measurement position and the yellow marker identifies the nearest sensitive receptor.

4.3 Measurement Results

The measured data cover the period 29th April to 4th May 2026 and include LAeq,15min, LAFmax,15min and LA90,15min values. The data have been processed into complete one-hour periods for the purpose of deriving representative BS 4142 background levels.

Period	Complete one-hour samples	LAeq,T	Mean LA90,1h	Median LA90,1h	Rounded modal LA90,1h	Adopted LA90,1h
Daytime 07:00-19:00	56	51.3	47.5	48.3	49 dB	48 dB
Evening 19:00-23:00	20	48.7	42.3	43.6	44 dB	44 dB
Day/evening 07:00-23:00	76	50.8	46.1	46.8	49 dB	44 dB evening controls

4.3.1 Daily Summary - 07:00-23:00

Date	Operational LAeq,T	Mean LA90,1h	Minimum LA90,1h	Complete hours
2026-04-29	50.5	46.8	42.0	11
2026-04-30	51.2	46.9	39.2	16
2026-05-01	51.5	47.3	44.4	16
2026-05-02	51.1	45.0	32.8	16
2026-05-03	49.1	44.8	42.2	16
2026-05-04	50.4	47.0	47.0	1

5 OPERATION OF SITE AND SOURCE LEVELS

5.1 Proposed Kitchen Extract System

The proposed kitchen ventilation arrangement comprises kitchen extract ductwork, carbon filter housing, roof-mounted EF.01 extract fan on Big Foot frame with flexible connections, discharge attenuator and bird-beak kitchen extract discharge terminal. The drawing identifies an attenuator within the discharge path; however final manufacturer acoustic data for the fan and attenuator have not been provided. This report therefore specifies minimum octave-band acoustic performance needed for compliance and recommends manufacturer/contractor confirmation before installation.

5.2 Source Sound Power Levels

The assessment uses the selected Systemair plant data. The kitchen extract path is assessed using Systemair MUB 062 630D4 outlet and surrounding sound power data. The fresh-air intake/supply path is assessed using Systemair MUB 062 560D6 inlet and surrounding sound power data. Duct breakout calculations use the relevant in-duct octave-band fan sound power spectrum. The source paths are assessed separately because the terminal, casing and exposed ductwork are in different positions and have different noise-control mechanisms.

Source path	63	125	250	500	1000	2000	4000	8000	Total
Extract outlet Lw dB(A)	60	80	83	86	88	84	81	73	92.0
Extract casing Lw dB(A)	39	63	54	53	56	55	47	37	65.0
Extract duct internal level	60	80	83	86	88	84	81	73	92.0
Fresh-air terminal Lw dB(A)	48	67	68	70	71	70	65	59	77.0
Fresh-air casing Lw dB(A)	28	51	41	38	41	42	32	24	52.0
Fresh-air duct internal level	48	67	68	70	71	70	65	59	77.0

5.3 Character Correction

A +5 dB character correction has been adopted for design purposes, comprising a conservative allowance for potential tonal and intermittent/distinctive elements from the fan/duct system. The final post-installation assessment should include measured one-third octave or narrow-band review, as necessary, to confirm whether any tonal or other distinctive acoustic features are present. The design target in this report assumes the +5 dB correction remains applicable, which is conservative.

6 CALCULATION METHODOLOGY

6.1 Source Directivity

A +3 dB directivity/reflection correction has been applied to each terminal, fan casing and duct breakout path. This allows for the location of the plant and ductwork adjacent to building surfaces and is considered suitably conservative for planning-stage assessment.

6.2 Geometric Divergence

Distance attenuation has been calculated using the ISO 9613-2 form for geometric divergence: $A_{div} = 20 \log_{10}(d) + 11$, where d is the source-receptor distance in metres. The calculation has been applied separately to the extract discharge terminal, fresh-air intake terminal, extract fan casing, fresh-air fan casing and exposed duct breakout paths. Duct length attenuation, bend/section effects, regenerated-noise allowance and end reflection loss have been included in the octave-band schedules before receptor propagation is applied.

Path	Distance d	A_{div}	Directivity correction
Extract terminal to receptor	10.65 m	31.5 dB	+3 dB
Fresh-air terminal to receptor	15.34 m	34.7 dB	+3 dB
Fan casing / exposed duct paths to receptor	10.00 m	31.0 dB	+3 dB

6.3 Logarithmic Addition

The combined plant specific level has been calculated by logarithmic addition of all relevant extract terminal, fresh-air terminal, fan casing/breakout and exposed duct breakout contributions. The build-up of the unmitigated total is shown in Section 7.4 and the mitigated total is shown in Section 7.6. The assumptions behind the propagation, duct, terminal, breakout and mitigation terms are defined in Appendix E and the data-status schedule is provided in Appendix F.

7 CALCULATIONS AND ASSESSMENT

All calculated levels are external free-field receptor levels and are compared with the controlling representative evening background level of 44 dB LA90,1h adopted for the BS 4142 design assessment. No assessment of plant operation during 23:00-07:00 is included because no night-time kitchen extract operation is proposed. The assumptions and input criteria used in the calculation tables are cross-referenced to Appendix E (Assumptions A1-A15 and calculation methodology references C1-C8/M1-M3), with the source-data and mitigation confirmation status summarised in Appendix F.

Calculation stage	Noise path	Purpose	Report table
10.1	Extract terminal	Includes source L _w , duct length attenuation, bend/section effects, regenerated-noise allowance, end reflection, directivity and distance. Uses Appendix E A3, A6-A11 and C4-C6.	Extract discharge calculation
10.2	Extract casing	Includes casing L _w , directivity/reflection and geometric divergence. Uses Appendix E A5-A7 and C4-C5.	Extract casing calculation
10.3	Extract duct breakout	Includes internal duct level, duct wall/breakout loss, length effects, directivity and distance. Uses Appendix E A5-A8, A10, A12 and C7.	Extract duct breakout calculation
10.4	Fresh-air terminal	Includes source L _w , duct length attenuation, bend/section effects, end reflection, directivity and distance. Uses Appendix E A4, A6-A11 and C4-C6.	Fresh-air intake calculation
10.5	Fresh-air casing	Includes casing L _w , directivity/reflection and geometric divergence. Uses Appendix E A5-A7 and C4-C5.	Fresh-air casing calculation
10.6	Fresh-air duct breakout	Includes internal duct level, duct wall/breakout loss, directivity and distance. Uses Appendix E A5-A8, A10, A12 and C7.	Fresh-air duct breakout calculation
10.7	Combined unmitigated and mitigated plant level	Logarithmically combines all relevant paths, applies Appendix E A13-A15 mitigation where relevant, and compares with the evening criterion A1/A2.	Combined assessment

7.1 Unmitigated Discharge Noise

Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Extract discharge/fan outlet Lw	60.0	80.0	83.0	86.0	88.0	84.0	81.0	73.0	92.0
Duct length attenuation	0.5	1.0	1.5	2.0	2.5	3.0	3.0	3.0	--
Bend/section attenuation	0.0	1.0	2.0	3.0	3.0	2.0	1.0	1.0	--
Bend/regenerated-noise allowance	0.0	0.0	1.0	2.0	2.0	1.0	0.0	0.0	--
End reflection loss	10.0	6.0	3.0	1.0	0.0	0.0	0.0	0.0	--
Add directivity correction	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	
Less geometric divergence 10.65 m	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	
Resulting extract discharge level at receptor	21.0	43.5	49.0	53.5	56.0	51.5	48.5	40.5	59.7

7.2 Unmitigated Fan Casing / Breakout Noise

Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Extract fan casing sound power Lw	39.0	63.0	54.0	53.0	56.0	55.0	47.0	37.0	65.0
Add directivity correction	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	
Less geometric divergence 10.00 m	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	
Resulting extract fan casing level at receptor	11.0	35.0	26.0	25.0	28.0	27.0	19.0	9.0	37.1
Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Fresh-air duct internal level used for breakout	48.0	67.0	68.0	70.0	71.0	70.0	65.0	59.0	77.0
Duct length attenuation	0.5	1.0	1.5	2.0	2.5	3.0	3.0	3.0	--
Duct wall / breakout loss	10.0	12.0	15.0	18.0	20.0	22.0	22.0	22.0	--
Bend/regenerated-noise allowance	0.0	0.0	1.0	2.0	2.0	1.0	0.0	0.0	--
Add directivity correction	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	
Less geometric divergence 10.00 m	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	
Resulting fresh-air duct breakout level at receptor	9.5	26.0	24.5	24.0	22.5	18.0	12.0	6.0	30.8
Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Fresh-air fan casing sound power Lw	28.0	51.0	41.0	38.0	41.0	42.0	32.0	24.0	52.0
Add directivity correction	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	
Less geometric divergence 10.00 m	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	
Resulting fresh-air fan casing level at receptor	0.0	23.0	13.0	10.0	13.0	14.0	4.0	-4.0	24.4
Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Fresh-air intake/supply terminal Lw	48.0	67.0	68.0	70.0	71.0	70.0	65.0	59.0	77.0
Duct length attenuation	0.5	1.0	1.5	2.0	2.5	3.0	3.0	3.0	--
Bend/section attenuation	0.0	1.0	2.0	3.0	3.0	2.0	1.0	1.0	--

Bend/regenerated-noise allowance	0.0	0.0	1.0	2.0	2.0	1.0	0.0	0.0	--
End reflection loss	10.0	6.0	3.0	1.0	0.0	0.0	0.0	0.0	--
Add directivity correction	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	
Less geometric divergence 15.34 m	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	
Resulting fresh-air intake level at receptor	5.8	27.3	30.8	34.3	35.8	34.3	29.3	23.3	40.8
Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Extract duct internal level used for breakout	60.0	80.0	83.0	86.0	88.0	84.0	81.0	73.0	92.0
Duct length attenuation	0.5	1.0	1.5	2.0	2.5	3.0	3.0	3.0	--
Duct wall / breakout loss	10.0	12.0	15.0	18.0	20.0	22.0	22.0	22.0	--
Bend/regenerated-noise allowance	0.0	0.0	1.0	2.0	2.0	1.0	0.0	0.0	--
Add directivity correction	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	+3.0	
Less geometric divergence 10.00 m	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	
Resulting extract duct breakout level at receptor	21.5	39.0	39.5	40.0	39.5	32.0	28.0	20.0	45.8

7.3 Unmitigated Combined Assessment

Item		Value					Comment		
Combined specific level		60.0 dB LAeq,T					Logarithmic sum of extract discharge, fresh-air intake, fan casing and duct breakout contributions.		
Character correction		+5 dB					Conservative design-stage allowance.		
Rating level		65.0 dB LAr,Tr					Specific level plus character correction.		
Evening background criterion		44 dB LA90,1h					Controlling 19:00-23:00 period.		
Excess over evening criterion		+21.0 dB					Above the council criterion; mitigation required.		
Assessment outcome		Significant adverse indication					Mitigation required before operation.		
Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Total
Combined unmitigated receptor level	24.7	45.4	49.5	53.7	56.1	51.6	48.5	40.6	60.0

7.4 Accumulative unmitigated component assessment

The following table shows the individual octave-band receptor contributions used to build up the overall unmitigated specific sound level. The total is a logarithmic sum of the extract discharge, fresh-air intake, fan casing/breakout and exposed duct breakout paths.

Component	63	125	250	500	1000	2000	4000	8000	Overall
Extract terminal	21.0	43.5	49.0	53.5	56.0	51.5	48.5	40.5	59.7
Extract casing	11.0	35.0	26.0	25.0	28.0	27.0	19.0	9.0	37.1
Extract duct breakout	21.5	39.0	39.5	40.0	39.5	32.0	28.0	20.0	45.8
Fresh-air terminal	5.8	27.3	30.8	34.3	35.8	34.3	29.3	23.3	40.8
Fresh-air casing	0.0	23.0	13.0	10.0	13.0	14.0	4.0	-4.0	24.4
Fresh-air duct breakout	9.5	26.0	24.5	24.0	22.5	18.0	12.0	6.0	30.8
Total specific level	24.7	45.4	49.5	53.7	56.1	51.6	48.5	40.6	60.0

7.5 Required Mitigation for Proposed Daytime/Evening Operation

The terminal attenuation schedule is based on the supplied AMS Type R2 attenuator static insertion loss for the 1200 mm length. The R2 attenuator gives high mid/high-frequency insertion loss; however, fan casing and duct breakout paths remain relevant after terminal attenuation and must also be controlled. The final contractor selection must confirm dimensional compatibility, pressure drop, grease/cleaning access, fire strategy compatibility, and no adverse effect on ventilation/odour-control performance.

Octave band, Hz	63	125	250	500	1000	2000	4000	8000	Overall
Terminal attenuator DIL, dB	11	20	34	50	50	50	50	48	--
Fan casing/screening reduction, dB	10	14	16	18	18	18	16	14	--
Duct breakout treatment, dB	4	6	9	10	10	10	8	6	--
Mitigated receptor level, dB	18.5	33.9	30.8	30.1	29.7	22.4	20.2	14.3	37.8

7.6 Mitigated component assessment

The following table applies the specified terminal attenuation, fan casing/screening reduction and duct breakout treatment to each individual noise path before logarithmic summation. This demonstrates how the mitigated overall specific sound level has been derived.

Component	63	125	250	500	1000	2000	4000	8000	Overall
Extract terminal	10.0	23.5	15.0	3.5	6.0	1.5	-1.5	-7.5	24.4
Extract casing	1.0	21.0	10.0	7.0	10.0	9.0	3.0	-5.0	22.1
Extract duct breakout	17.5	33.0	30.5	30.0	29.5	22.0	20.0	14.0	37.3
Fresh-air terminal	-5.2	7.3	-3.2	-15.7	-14.2	-15.7	-20.7	-24.7	8.0
Fresh-air casing	-10.0	9.0	-3.0	-8.0	-5.0	-4.0	-12.0	-18.0	9.8
Fresh-air duct breakout	5.5	20.0	15.5	14.0	12.5	8.0	4.0	0.0	22.8
Total mitigated specific	18.5	33.9	30.8	30.1	29.7	22.4	20.2	14.3	37.8

Table 10: Daytime/evening attenuation schedule and mitigated receptor spectrum using the AMS Type R2 1200 mm terminal attenuation and casing/duct breakout treatment.

Assessment item	Value	Colour-coded BS4142 outcome
Specific sound level with mitigation	37.8 dB LAeq,T	
Rating level with +5 dB correction	42.8 dB LAr,Tr	
Evening background criterion	44 dB LA90,1h	
Assessment margin	-1.2 dB	Low impact / below or broadly at background

The unmitigated kitchen extract and fresh-air intake/supply arrangement is predicted to exceed the adopted daytime/evening background criterion at the nearest residential receptor. Mitigation is therefore required. For operation during the proposed operating period, the system should incorporate the R2 1200 mm terminal attenuation, fan casing/screening and enhanced duct breakout treatment specified in this report. No kitchen extract / plant operation during 23:00-07:00 is proposed or assessed.

8 RECOMMENDED MITIGATION SPECIFICATION

Mitigation item	Minimum requirement
Extract discharge attenuator / silencer	Install a discharge attenuator/silencer on the kitchen extract discharge path achieving no less than the octave-band dynamic insertion loss stated in this report. Final selection shall be suitable for kitchen extract duty, pressure drop, grease/fire considerations and cleaning access.
Fresh-air intake attenuator / silencer	Install attenuation on the fresh-air intake/supply path achieving no less than the octave-band insertion loss stated in this report. The selected product shall be compatible with the final fan duty, pressure drop and weather protection requirements.
Fan casing / acoustic screening	Provide acoustically lined enclosure/screening or equivalent casing treatment to extract and fresh-air fan/plant items achieving no less than the octave-band casing reduction stated in this report. Treatment shall not obstruct airflow or maintenance access.
Exposed duct breakout treatment	Provide acoustic lagging/enclosure to exposed extract and fresh-air ductwork achieving no less than the octave-band duct breakout reduction stated in this report. Treatment shall not compromise cleaning access, fire strategy, structural support or ventilation performance.
Anti-vibration isolation	Fit fans and all ductwork supports with resilient anti-vibration mounts or isolation pads suitable for the static and dynamic load of the installation.
Flexible connections	Provide flexible connectors between fan, ductwork and rigid supports where necessary to limit structure-borne noise transfer.
Ductwork supports	Ductwork brackets/supports shall include resilient separation from the building fabric where practicable.
Operating period	No kitchen ventilation operation during 23:00-07:00 is proposed or assessed. Operation shall be limited to the daytime/evening operating period assessed in this report.
Post-installation verification	Undertake a post-installation BS 4142 verification survey at a position representative of the nearest residential receptor, including full spectrum analysis to confirm final levels and the absence of tonal or other distinctive features.
Maintenance	Maintain filters, fan, attenuators and any acoustic enclosure/screening/lagging in accordance with manufacturer recommendations and the approved maintenance regime.

8.1 Suggested Planning / Compliance Condition Wording

The kitchen extract plant shall not be operated unless the discharge attenuation and fan casing/screening treatments installed achieve acoustic performance no worse than the minimum octave-band values stated in this report. The fan and ductwork shall be mounted on resilient anti-vibration supports and connected to the ductwork using appropriate flexible connections where required. No kitchen extract operation during 23:00-07:00 is proposed or assessed. A post-installation BS 4142 verification survey shall be undertaken at a position representative of the nearest residential receptor, including full spectrum analysis to confirm that the plant noise does not exceed the adopted background criterion and that no tonal or other distinctive acoustic features are present. The verified mitigation shall thereafter be retained and maintained.

9 COLOUR-CODED BS4142 ASSESSMENT SUMMARY

The following table summarises the BS 4142 assessment outcome using the evening design criterion as the controlling normal operating period. The colour coding follows the adopted criterion: green at or below background, yellow around +5 dB, and red around +10 dB or more above background.

Scenario	Specific level	Character correction	Rating level	Difference versus 44 dB evening background	Outcome
Unmitigated combined plant	60.0 dB	+5 dB	65.0 dB	+21.0 dB	Significant adverse / mitigation required
Mitigated with AMS R2 1200 mm terminal attenuation + casing/duct breakout treatment	37.8 dB	+5 dB	42.8 dB	-1.2 dB	Low impact / below or broadly at background
Post-installation verification	To be measured	As measured / assessed	To be confirmed	Must not exceed background	Required by suggested condition wording

10 CONCLUSIONS

Impact Acoustics Ltd have undertaken a BS 4142:2014+A1:2019 noise impact assessment for the proposed kitchen extract and fresh-air intake/supply ventilation arrangement serving 97-99 Montague Street, Worthing. The assessment has considered the nearest residential receptor shown on the supplied annotated aerial imagery and has separately assessed the extract discharge, fresh-air intake, fan casing/breakout and exposed duct breakout paths because the source positions, source mechanisms and propagation distances differ.

Measured background sound data from 29th April to 4th May 2026 indicate a representative evening background level of 44 dB LA90,1h during 19:00-23:00. This is the controlling representative value within the proposed operating period and has been adopted as the design criterion for the BS 4142 assessment. No kitchen extract / plant operation during 23:00-07:00 is proposed or assessed.

The unmitigated kitchen extract and fresh-air intake/supply arrangement is predicted to exceed the adopted daytime/evening background criterion at the nearest residential receptor. Mitigation is therefore required. For operation during the proposed operating period, the system should incorporate the R2 1200 mm terminal attenuation, fan casing/screening and enhanced duct breakout treatment specified in this report. No kitchen extract / plant operation during 23:00-07:00 is proposed or assessed.

With the specified daytime/evening mitigation package comprising AMS Type R2 1200 mm terminal attenuation, fan casing/screening and enhanced exposed duct breakout treatment achieving the stated minimum octave-band reductions, the predicted rating level reduces to 42.8 dB LAr,Tr. This is 1.2 dB below the representative evening background criterion of 44 dB LA90,1h and is therefore a Low Impact indication in accordance with BS4142:2014+A1:2019, subject to contractor confirmation of final installation details and post-installation verification.

10.1 Uncertainty

The principal uncertainties relate to final fan duty point, exact installation geometry, shielding, the final attenuator/enclosure selections, duct breakout performance and whether any acoustic character is present post-installation. These uncertainties have been addressed by using conservative octave-band source data, assessing discharge and fan casing paths separately, adopting the shortest controlling source-receptor distances, applying a +5 dB character correction and specifying minimum octave-band mitigation performance. A post-installation verification assessment is necessary to confirm the final installed performance.

11 APPENDIX A - HOURLY BACKGROUND DATA

Date	Hour	LAeq,1h	LA90,1h	LAFmax,1h
29/04/2026	12:00	52.0	49.3	62.6
29/04/2026	13:00	52.1	49.0	67.0
29/04/2026	14:00	51.8	49.1	62.9
29/04/2026	15:00	52.3	50.0	62.5
29/04/2026	16:00	52.1	50.0	62.9
29/04/2026	17:00	50.0	47.6	67.7
29/04/2026	18:00	49.6	46.7	69.1
29/04/2026	19:00	47.7	44.1	72.1
29/04/2026	20:00	48.6	43.8	81.7
29/04/2026	21:00	48.0	43.8	62.6
29/04/2026	22:00	47.1	42.0	61.9
29/04/2026	23:00	44.1	39.2	57.2
30/04/2026	00:00	42.1	37.1	57.6
30/04/2026	01:00	41.9	37.7	60.3
30/04/2026	02:00	41.2	37.8	58.5
30/04/2026	03:00	43.2	39.1	59.7
30/04/2026	04:00	50.4	45.9	72.2
30/04/2026	05:00	54.0	50.2	79.2
30/04/2026	06:00	53.8	51.2	66.6
30/04/2026	07:00	52.6	50.1	76.2
30/04/2026	08:00	52.5	49.9	70.4
30/04/2026	09:00	51.9	48.8	66.8
30/04/2026	10:00	53.9	50.1	68.2
30/04/2026	11:00	53.7	50.1	70.0
30/04/2026	12:00	52.8	49.1	67.5
30/04/2026	13:00	51.9	48.9	65.3
30/04/2026	14:00	53.1	49.7	86.9
30/04/2026	15:00	52.9	50.3	66.3
30/04/2026	16:00	51.3	49.1	62.6
30/04/2026	17:00	49.9	47.1	69.8
30/04/2026	18:00	47.6	44.5	58.7
30/04/2026	19:00	43.6	40.7	65.1
30/04/2026	20:00	45.1	41.3	71.0
30/04/2026	21:00	44.4	40.8	60.0

30/04/2026	22:00	42.9	39.2	71.2
30/04/2026	23:00	42.4	40.2	62.2
01/05/2026	00:00	41.2	39.4	51.0
01/05/2026	01:00	42.2	39.6	57.0
01/05/2026	02:00	42.2	39.7	56.5
01/05/2026	03:00	44.2	41.1	57.6
01/05/2026	04:00	45.3	41.9	59.3
01/05/2026	05:00	48.9	43.5	66.6
01/05/2026	06:00	47.8	44.3	65.2
01/05/2026	07:00	51.1	47.4	66.4
01/05/2026	08:00	50.9	48.0	66.9
01/05/2026	09:00	51.4	48.8	61.1
01/05/2026	10:00	51.3	48.6	65.9
01/05/2026	11:00	52.2	49.1	66.9
01/05/2026	12:00	52.9	49.3	69.7
01/05/2026	13:00	53.4	49.4	65.9
01/05/2026	14:00	52.0	48.9	63.9
01/05/2026	15:00	50.3	47.2	69.3
01/05/2026	16:00	49.7	46.8	64.4
01/05/2026	17:00	49.5	46.2	69.7
01/05/2026	18:00	49.4	45.9	67.2
01/05/2026	19:00	48.2	44.5	59.7
01/05/2026	20:00	51.2	45.4	69.1
01/05/2026	21:00	55.1	47.2	73.8
01/05/2026	22:00	49.9	44.4	66.9
01/05/2026	23:00	47.5	40.9	63.1
02/05/2026	00:00	48.4	41.2	62.8
02/05/2026	01:00	47.0	39.5	61.1
02/05/2026	02:00	46.7	39.1	62.8
02/05/2026	03:00	48.6	41.2	67.4
02/05/2026	04:00	50.2	43.9	63.4
02/05/2026	05:00	50.8	45.4	68.1
02/05/2026	06:00	49.6	45.3	66.1
02/05/2026	07:00	50.1	45.2	65.7
02/05/2026	08:00	51.0	47.0	64.7
02/05/2026	09:00	52.9	49.1	63.7

02/05/2026	10:00	53.6	50.0	68.4
02/05/2026	11:00	54.4	50.2	66.9
02/05/2026	12:00	54.5	49.9	70.9
02/05/2026	13:00	53.3	49.5	70.5
02/05/2026	14:00	52.4	48.4	71.4
02/05/2026	15:00	51.7	48.1	67.2
02/05/2026	16:00	50.2	46.8	63.6
02/05/2026	17:00	48.5	45.0	65.4
02/05/2026	18:00	48.0	44.0	67.9
02/05/2026	19:00	45.8	41.4	64.3
02/05/2026	20:00	44.5	38.5	61.5
02/05/2026	21:00	41.0	34.5	56.3
02/05/2026	22:00	39.7	32.8	60.6
02/05/2026	23:00	37.2	30.4	52.9
03/05/2026	00:00	39.9	30.9	59.5
03/05/2026	01:00	36.6	32.1	55.4
03/05/2026	02:00	39.6	33.8	56.5
03/05/2026	03:00	41.3	34.9	56.2
03/05/2026	04:00	46.5	40.7	63.3
03/05/2026	05:00	49.4	45.5	68.6
03/05/2026	06:00	49.4	46.5	69.5
03/05/2026	07:00	46.0	43.3	64.9
03/05/2026	08:00	46.7	43.0	65.8
03/05/2026	09:00	45.5	42.2	67.9
03/05/2026	10:00	46.1	42.9	64.3
03/05/2026	11:00	47.0	43.5	64.5
03/05/2026	12:00	47.6	44.1	63.8
03/05/2026	13:00	48.2	44.7	68.3
03/05/2026	14:00	47.5	44.8	65.7
03/05/2026	15:00	48.6	45.4	72.1
03/05/2026	16:00	47.4	44.9	65.9
03/05/2026	17:00	53.5	50.5	75.5
03/05/2026	18:00	51.1	46.6	76.2
03/05/2026	19:00	49.7	45.9	64.3
03/05/2026	20:00	49.1	45.3	63.6
03/05/2026	21:00	52.0	46.2	65.8

03/05/2026	22:00	50.1	43.3	67.4
03/05/2026	23:00	48.0	41.0	65.4
04/05/2026	00:00	47.9	42.5	66.0
04/05/2026	01:00	49.3	42.5	69.2
04/05/2026	02:00	52.0	45.3	66.1
04/05/2026	03:00	49.5	43.1	68.1
04/05/2026	04:00	48.7	43.6	65.6
04/05/2026	05:00	51.6	47.8	67.6
04/05/2026	06:00	51.4	48.3	67.7
04/05/2026	07:00	50.4	47.0	63.0

12 APPENDIX B - INFORMATION TO BE REPORTED

Requirement	Site-specific information
Competency	Report prepared by I Broom aMIOA of Impact Acoustics Ltd.
Source under investigation	Proposed kitchen extract and fresh-air intake/supply ventilation systems, including Systemair MUB 062 630D4 extract fan, Systemair MUB 062 560D6 fresh-air fan, terminal noise, fan casing/breakout and exposed duct breakout.
Subjective impression at assessment position	Urban town-centre context influenced by road traffic, commercial activity, parking/manoeuvring, pedestrian activity and nearby residential uses.
Existing context	Mixed-use commercial/residential premises at 97-99 Montague Street, Worthing, with nearby residential receptors at short separation distance.
Relative positions	Extract discharge assessed at 10.65 m; fresh-air terminal assessed at 15.34 m; fan casing and duct breakout paths assessed at 10.00 m to the nearest receptor.
Noise measurement data	Continuous 15-minute LAeq, LAFmax and LA90 data measured between 29th April and 4th May 2026 and processed into complete one-hour periods.
Reference time interval	Plant assessed against representative one-hour background levels for the proposed daytime/evening operating period only.
Specific noise levels	Unmitigated combined specific level 60.0 dB; mitigated daytime/evening specific level 37.8 dB.
Background noise level	44 dB LA90,1h during the controlling evening period 19:00-23:00; no night-time kitchen ventilation operation is proposed or assessed.
Rating levels	Unmitigated 65.0 dB; mitigated daytime/evening 42.8 dB.
Conclusions	Mitigation required. Daytime/evening operation is acceptable with the specified octave-band mitigation package and subject to post-installation verification and manufacturer confirmation.

13 APPENDIX C - CHARACTER CORRECTION

A +5 dB character correction has been adopted in the design assessment. This is conservative and reflects the potential for minor tonal and intermittent/distinctive character associated with a kitchen extract fan and duct system. The post-installation assessment should include full spectrum analysis to confirm whether tonal or other distinctive characteristics are present. If the installed plant is demonstrated to be neither tonal, intermittent nor otherwise distinctive, the rating level may be lower than the conservative design assessment presented in this report.

Potential characteristic	Design-stage correction	Comment
Tonality	+2 dB	Allowed as a conservative design-stage minor tonal allowance.
Intermittency / distinctive quality	+3 dB	Allowed as a conservative design-stage intermittency/distinctiveness allowance.
Total adopted correction	+5 dB	Applied to the specific level for all design calculations.

14 APPENDIX D - UNCERTAINTY BUDGET

Source of uncertainty	Uncertainty notes	Commentary	Value / half-width	Distribution	Divisor	Standard uncertainty (dB)
Manufacturer source sound power	Systemair MUB 630D4 / MUB 560D6 data and final duty point	Manufacturer data have been used for the selected plant. Residual uncertainty remains because final installed duty point, speed setting and system resistance may vary from the product-card operating points.	+/-2.0 dB	Rectangular	sqrt(3)	1.15
Fan duty point / operating condition	Final fan speed and system resistance	Actual duty point can change discharge, intake and casing levels.	+/-2.0 dB	Rectangular	sqrt(3)	1.15
Source path split	Extract, fresh-air, casing and duct paths	Separate assessment reduces uncertainty, but exact contribution depends on final installation geometry.	+/-1.5 dB	Rectangular	sqrt(3)	0.87
Source position / distance	Aerial / plan derived distances	Distances are rounded from the supplied annotated imagery; remaining tolerance allowed.	+/-1.0 dB	Rectangular	sqrt(3)	0.58
Directivity / facade reflection	+3 dB allowance applied	Allowance accounts for nearby building surfaces; residual uncertainty remains.	+/-1.5 dB	Rectangular	sqrt(3)	0.87
Meteorological propagation	Short source-receptor distance	Weather effects are limited at circa 10-15 m but not zero.	+/-0.5 dB	Rectangular	sqrt(3)	0.29
Duct length attenuation	Planning-stage duct length allowance	Final duct lengths and linings should be confirmed by the mechanical contractor.	+/-1.0 dB	Rectangular	sqrt(3)	0.58
Bend / regenerated noise correction	Bends, transitions and terminal effects	Allowance included; final system pressure/velocity may alter regenerated noise.	+/-1.5 dB	Rectangular	sqrt(3)	0.87
End reflection loss	Terminal end correction	Dependent on terminal geometry and duct diameter/area.	+/-1.0 dB	Rectangular	sqrt(3)	0.58
Duct breakout estimate	Duct wall loss and breakout assumptions	Depends on final duct gauge, supports, lagging and exposed length.	+/-2.0 dB	Rectangular	sqrt(3)	1.15
Mitigation installed performance	AMS R2 attenuator, casing and duct treatments	The R2 attenuation data have been used for terminal paths. Installed performance still depends on correct product selection, transitions, sealing, casing/screen details and duct lagging/enclosure installation.	+/-2.0 dB	Rectangular	sqrt(3)	1.15
Background sound level selection	Modal / representative LA90,1h	Selection based on measured distribution and operational periods.	+/-1.5 dB	Normal	2	0.75
Measurement instrumentation	Type 1 sound level meter and calibrator	Calibration drift and meter tolerance allowed.	+/-0.5 dB	Normal	2	0.25

Measurement position	Equivalent free-field position	Chosen to represent the receptor context while avoiding source contamination.	+/-1.0 dB	Rectangular	sqrt(3)	0.58
Acoustic character correction	Tonality/intermittency/distinctiveness	+5 dB applied conservatively; final measured penalty may differ.	+/-1.0 dB	Rectangular	sqrt(3)	0.58
Combined standard uncertainty	Root-sum-square of standard uncertainties	Indicative design-stage combined standard uncertainty.				3.14
Expanded uncertainty	k=2, approximately 95% confidence	Indicative expanded uncertainty to be considered in final verification.				+/-6.3 dB

The indicative expanded uncertainty is larger than the predicted daytime/evening compliance margin. This does not invalidate the assessment; rather, it reinforces the need for the specified mitigation to be selected and installed carefully and for the post-installation BS 4142 verification survey to confirm the final installed performance under representative operating conditions.

15 APPENDIX E - CALCULATION METHODOLOGY AND PROPAGATION ASSUMPTIONS

15.1 Assumptions and input criteria

The following schedule summarises the principal calculation inputs and assumptions used in the octave-band assessment. These should be checked against the final mechanical design and manufacturer selections before installation.

Input / assumption	Adopted value	Basis / note
A1 - Assessment criterion	44 dB LA90,1h representative evening background; design specific level target 39 dB LAeq,T before character correction.	Derived from the measured 19:00-23:00 data presented in Section 4.3 and Appendix A; applied in Sections 1.3.2, 2.3, 7 and 9.
A2 - Character correction	+5 dB	Applied in Sections 1.3.2, 5.3, 7.3, 7.6, 9 and Appendix C as a conservative design-stage allowance pending post-installation spectrum/tonality verification.
A3 - Extract terminal distance	10.65 m	From supplied annotated aerial measurement; used in Sections 3, 6.2 and 7.1.
A4 - Fresh-air terminal distance	15.34 m	From supplied annotated aerial measurement; used in Sections 3, 6.2 and 7.1.
A5 - Fan casing and exposed duct breakout distance	10.00 m	Shortest controlling path from supplied annotated aerial measurement; used in Sections 3, 6.2, 7.2, 7.4 and 7.6.
A6 - Geometric divergence	$A_{div} = 20 \log_{10}(d) + 11$	ISO 9613-2 relationship used in Sections 6.2 and 7 for sound power to free-field sound pressure conversion.
A7 - Directivity/reflection correction	+3 dB to each external path	Conservative allowance for plant/ductwork adjacent to building surfaces; used in Sections 6.1 and 7.
A8 - Duct length attenuation	0.5, 1, 1.5, 2, 2.5, 3, 3, 3 dB from 63 Hz to 8 kHz	Planning-stage allowance pending contractor confirmation; used in Section 7 terminal and breakout calculation schedules.
A9 - Bend/section attenuation	0, 1, 2, 3, 3, 2, 1, 1 dB from 63 Hz to 8 kHz	Engineering allowance for duct bends/sections; used in Section 7 terminal calculation schedules.
A10 - Bend/regenerated-noise allowance	0, 0, 1, 2, 2, 1, 0, 0 dB from 63 Hz to 8 kHz	Conservative turbulence/transition allowance; used in Section 7 terminal and duct breakout schedules. Final velocity/pressure drop to be confirmed.
A11 - End reflection loss	10, 6, 3, 1, 0, 0, 0, 0 dB from 63 Hz to 8 kHz	Terminal/end correction allowance; used in Section 7 terminal calculation schedules. Final terminal geometry to be confirmed.
A12 - Duct wall/breakout loss	10, 12, 15, 18, 20, 22, 22, 22 dB from 63 Hz to 8 kHz	Planning-stage breakout loss for exposed duct sections; used in Section 7 duct breakout schedules. Final duct gauge/construction to be confirmed.
A13 - Terminal attenuator requirement	11, 20, 34, 50, 50, 50, 50, 48 dB from 63 Hz to 8 kHz	AMS Type R2 1200 mm attenuator static insertion loss; applied in Sections 7.5, 7.6 and Appendix F.
A14 - Fan casing/screening requirement	10, 14, 16, 18, 18, 18, 16, 14 dB from 63 Hz to 8 kHz	Minimum reduction applied in Sections 7.5, 7.6, 8 and Appendix F for fan/plant casing breakout control.
A15 - Duct breakout treatment requirement	4, 6, 9, 10, 10, 10, 8, 6 dB from 63 Hz to 8 kHz	Minimum additional lagging/enclosure reduction required for exposed duct breakout paths after assessment of the selected Systemair plant and R2 terminal attenuation; applied in Sections 7.5 and 7.6.
A16 - Manufacturer data status	Selected Systemair MUB 062 630D4 and MUB 062 560D6 plant data and AMS Type R2 1200 mm attenuator data have been used. Final installed duty point, duct construction and product selections remain subject to contractor confirmation.	Section 5.2, Sections 7.1-7.6, Appendix F and Appendix G identify the data sources and confirmation requirements.

Ref	Calculation methodology / assumption	Basis
C1	Nearest receptor is the residential facade/window position shown on the supplied annotated aerial imagery.	Section 3 source-receptor description, Figure 1 and supplied annotated aerial geometry.
C2	Extract and fresh-air systems are assessed separately because terminal positions and source mechanisms differ.	Sections 3, 5.1 and 7 identify the extract and fresh-air systems as separate paths.
C3	Extract terminal distance is 10.65 m; fresh-air terminal distance is 15.34 m; fan/duct breakout paths are assessed at 10.00 m.	Section 3 receptor table and Section 6.2 propagation table; also Assumptions A3-A5.
C4	Geometric divergence is calculated as $A_{div} = 20 \log_{10}(d) + 11$.	Section 6.2 and Assumption A6; ISO 9613-2:1996 is listed as Reference R4.
C5	A +3 dB directivity/reflection correction is applied to each path.	Section 6.1 and Assumption A7.
C6	Duct length attenuation, bend/section effects, regenerated-noise allowance and end reflection loss are included in octave bands before propagation.	Section 7 calculation schedules and Assumptions A8-A11.
C7	Duct breakout is assessed from internal duct levels, duct wall/breakout loss and receptor propagation.	Sections 7.4 and 7.6 component tables and Assumptions A12/A15.
C8	Extract discharge and fresh-air intake attenuation are based on the supplied AMS Type R2 1200 mm insertion-loss data.	Maintains direct link between the assessed mitigation and the selected attenuator datasheet in Appendix F.
M1	Extract discharge and fresh-air intake attenuation are stated as minimum octave-band insertion loss.	Sections 7.5, 7.6, 8 and Appendix F; Assumption A13.
M2	Fan casing/screening and duct breakout treatment are stated as minimum octave-band reductions.	Sections 7.5, 7.6, 8 and Appendix F; Assumptions A14-A15.
M3	Post-installation verification is required.	Sections 8.1, 9, 10 and Appendix B.

16 APPENDIX F - MANUFACTURER DATA AND MITIGATION DETAILS

16.1 Drawing data, calculation input status and confirmation requirements

Appendix F is provided as the audit trail for the source and mitigation data used in the calculation. The first table confirms the drawing/data status, the second table records the starting octave-band source inputs, and the third table records the minimum octave-band mitigation performance used in the mitigated assessment. The selected fan and attenuator data have been used in the assessment; final contractor/manufacturer selections, installed duty points, transitions, duct gauge, lagging/enclosure details and maintenance access arrangements must be checked against the stated acoustic criteria before installation.

Data item	Data used in assessment	Datasheet / confirmation status
Proposed ventilation layout	AVE Ltd drawing C7103-DW-00-001 P01 used for system layout, source locations, duct/terminal arrangement and attenuator location. P01, issued for approval 19.05.2026, is the drawing basis for this assessment.	Drawing included as Figure 2 and Appendix F Figure F1/F2. External citation R5.
Extract fan/source acoustic data	Systemair MUB 062 630D4 outlet, surrounding and relevant in-duct sound power schedules used for extract terminal, casing and duct breakout calculations.	Supplied Systemair product card reviewed; octave-band sound power table included on page 2 of the supplied datasheet.
Fresh-air fan/source acoustic data	Systemair MUB 062 560D6 inlet, surrounding and relevant in-duct sound power schedules used for fresh-air terminal, casing and duct breakout calculations.	Systemair product information confirms plant identity and duty; octave-band acoustic data from Systemair catalogue information for the same fan type/duty have been used for sound power calculations.
Ductwork breakout data	Duct wall/breakout loss and enhanced duct breakout treatment requirements used with the selected Systemair fan spectra.	Final duct gauge, construction, lining/lagging, exposed lengths and penetrations to be confirmed by the contractor.
Extract discharge attenuation	AMS Type R2 1200 mm attenuator insertion loss applied to the extract discharge terminal path.	Supplied AMS Type R2 attenuation sheet included in this appendix; product must be installed with compatible transitions and access arrangements.
Fresh-air intake attenuation	AMS Type R2 1200 mm attenuator insertion loss applied to the fresh-air intake/supply terminal path where attenuation is required.	Final silencer/attenuator arrangement must meet or exceed the stated R2 performance and be compatible with the ventilation design.
Fan casing/screening mitigation	Minimum octave-band casing/screening reduction applied to extract and fresh-air casing paths in Sections 7.5 and 7.6.	Final proprietary enclosure/screen build-up or acoustic panel data to be confirmed; must meet or exceed Appendix E A14 / Appendix F mitigation schedule.
Anti-vibration/flexible connections	Required as a design/installation control measure to reduce structure-borne and re-radiated noise risk.	Final proprietary selection and installation details to be confirmed by mechanical contractor.

16.2 Starting source/input octave-band schedules used in the assessment

Source/input data	63	125	250	500	1000	2000	4000	8000	Overall
Extract outlet Lw dB(A)	60	80	83	86	88	84	81	73	92.0
Extract casing Lw dB(A)	39	63	54	53	56	55	47	37	65.0
Extract duct internal level	60	80	83	86	88	84	81	73	92.0
Fresh-air terminal Lw dB(A)	48	67	68	70	71	70	65	59	77.0
Fresh-air casing Lw dB(A)	28	51	41	38	41	42	32	24	52.0
Fresh-air duct internal level	48	67	68	70	71	70	65	59	77.0

16.3 Minimum octave-band mitigation schedules used in the assessment

Mitigation	63	125	250	500	1000	2000	4000	8000	Overall
Terminal attenuation DIL, dB	11	20	34	50	50	50	50	48	--
Fan casing/screening reduction, dB	10	14	16	18	18	18	16	14	--
Duct breakout treatment, dB	4	6	9	10	10	10	8	6	--

The drawing extracts below identify the proposed ventilation arrangement and the attenuator location relied upon for the assessment. These are drawing/data-status figures only. They are not a substitute for final fan, attenuator, ductwork breakout or acoustic treatment datasheets, which must be provided by the mechanical contractor and must meet or exceed the octave-band schedules in Sections 7 and 16.

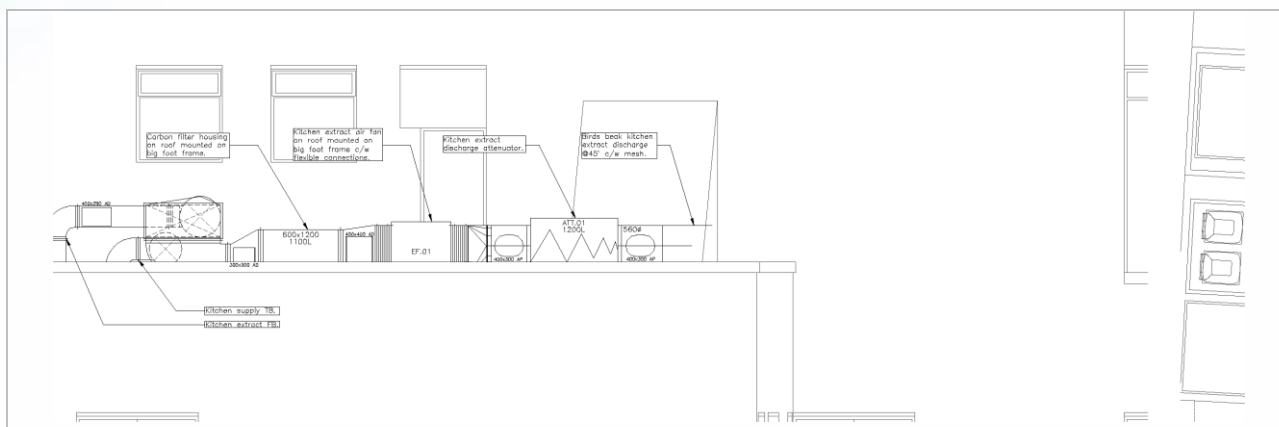


Figure F1: Extract from proposed kitchen ventilation layout C7103-DW-00-001 P01 showing the proposed carbon filter, EF.01 fan, attenuator and terminal arrangement. Final installed product selections should be confirmed by the contractor.

16.4 Drawing extract - attenuator location and benchmark requirement

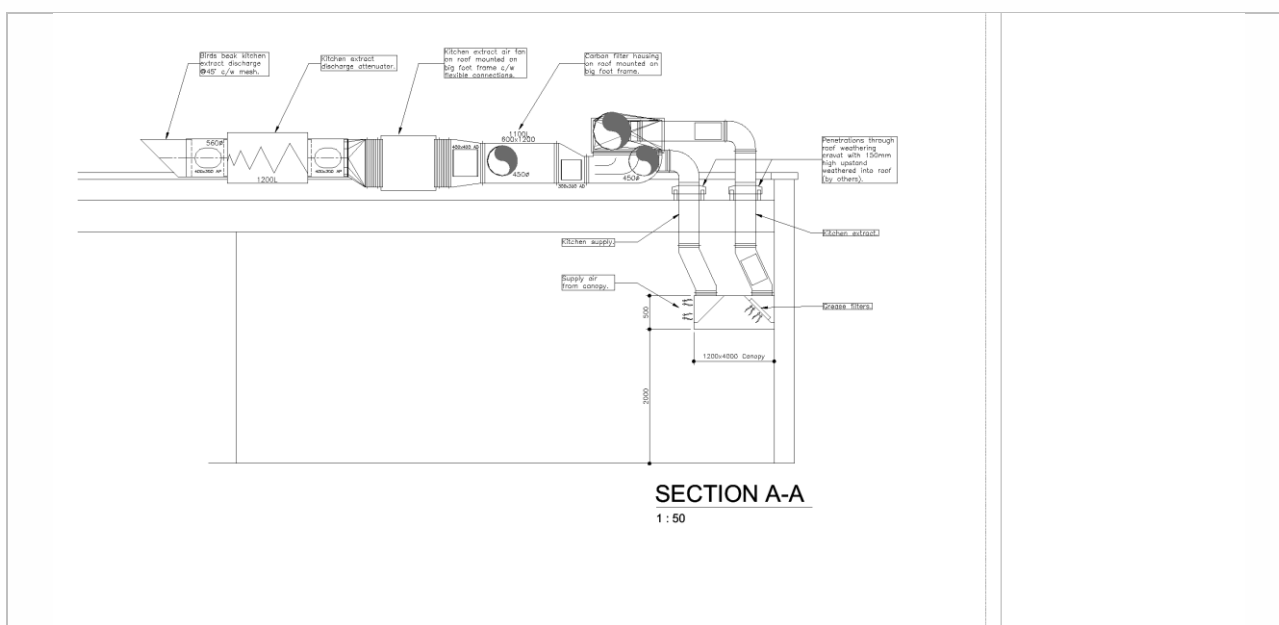
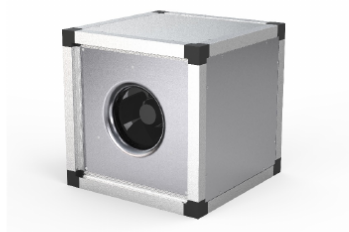


Figure F2: Drawing extract showing the proposed discharge/attenuator arrangement. Final attenuator selection must meet or exceed the octave-band attenuation schedule stated in this report.

**MUB 062 630D4 Multibox**

Article Number: #235398

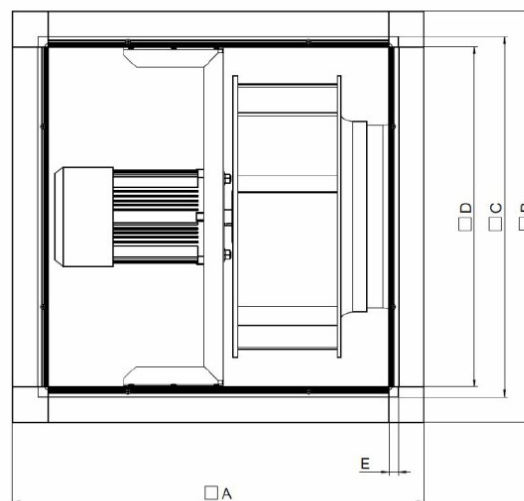
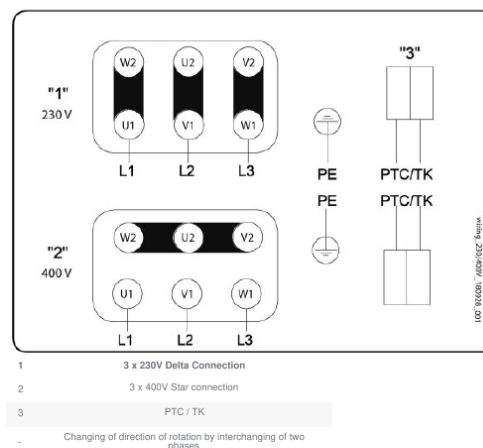
Operating Mode: 400V 3~ 50Hz - 90° air flow

**Technical parameters**

Nominal data	
Voltage (nominal)	400 V
Frequency	50 Hz
Phases	3~
Input power	4,499 W
Input current	8 A
Impeller speed	1,464 rpm
Air flow	max 4.2492 m³/s
Temperature of transported air	max 55 °C
Max temperature of transported air, when speed controlled	55 °C
Protection/Classification	
Enclosure class, motor	IP55
Insulation class	F
Data according to ErP	
ErP ready	ErP 2018
Dimensions and weights	
Weight	111.5 kg
Others	
Motor type	AC

Dimension

MUB 062	□A	□B	□C	□D	E
560/630	820	820	720	678	21

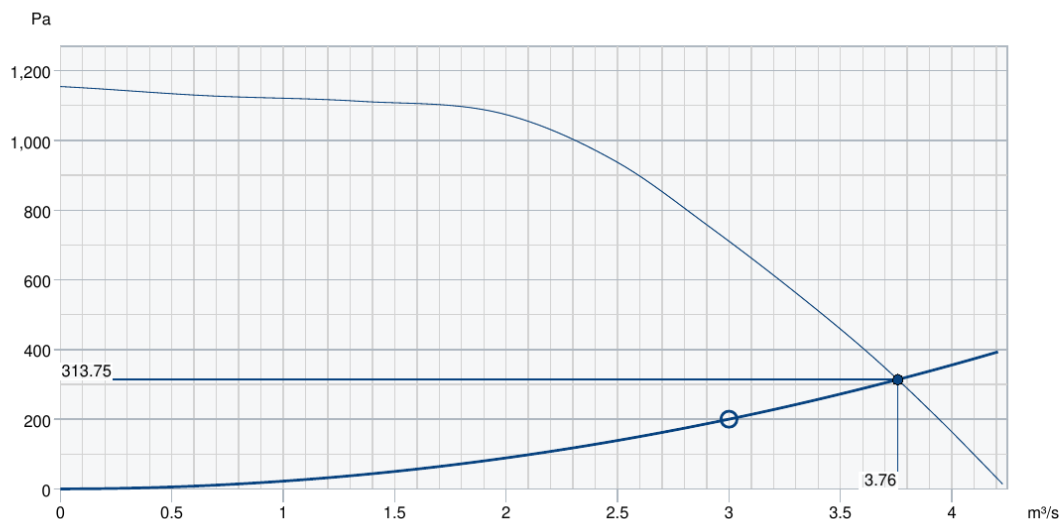
**Wiring**

Article name: MUB 062 630D4 Multibox | Product link: <https://shop.systemair.com/en-GB/productPermalink?p=522806> | Item Number: 235398 | Variant: 400V 3~ 50Hz - 90° air flow | Document type: Product card | Created at: 22.10.2023 | Generated by: Systemair Online Catalogue | Language: English

Page 1 of 2

Figure F3: Systemair MUB 062 630D4 Multibox product card page 1, identifying the selected extract fan technical data.

Performance curve



Hydraulic data										
Required air flow		3.00 m³								
Required static pressure		200 Pa								
Working air flow		3.76 m³								
Working static pressure		314 Pa								
Air density		1.204 kg/m³								
Power		3,940.9 W								
Fan control - RPM		1,465 rpm								
Current		7.24 A								
SFP		1.049 kW/m³								
Control voltage		400.0 V								
Supply voltage		400 V								
Sound power level		63	125	250	500	1k	2k	4k	8k	Total
Inlet	dB(A)	59	79	82	85	86	83	80	72	91
Outlet	dB(A)	60	80	83	86	88	84	81	73	92
Surrounding	dB(A)	39	63	54	53	56	55	47	37	65
Sound pressure level at 3m (20m² Sabine)	dB(A)	-	-	-	-	-	-	-	-	58
Sound pressure level at 3m free field	dB(A)	-	-	-	-	-	-	-	-	44
Accessories										

Accessories

FGV 062/716-716 flex. conn. (4198)

Frequency converter FRQ5-10A (36230)

Frequency converter FXDM14AM (31389)

SD-MUB Vibration pad set (37324)

U-EK230E Motor protection (30199)

WSD 062 (860x860x70) complete (31482)

Frequency converter FRQS-10A (36232)

CCM inlet MUB062 d560 (311782)

CCM outlet MUB062 d560 (311684)

CCMI outlet 062 d560 KIT 30mm (239095)

GRU 062-820/100 (276662)

KKC-DX-R 062 cooling section (277266)

KKC-W-R 062 cooling section (277274)

KKH-HW 062 heater-section (93340)

SDM Service Door MUB 062 30mm (273935)

Frequency converter FRQ-10A (36228)

Frequency converter FRQ5S-10A (36234)

REV-5POL/05-7.5kW R/Y (33979)

TUNE-AHU-DE008-062-718x718-M0 (79882)

UGS 062/630 adapter flex. (4358)

WSG 062 MUB complete (31486)

REV-5POL/07-EMV-7.5kW R/Y (34549)

CCM inlet MUB062 d630 (311783)

CCM outlet MUB062 d630 (311681)

CCMI outlet 062 d630 KIT 30mm (239096)

KKC-DX-L 062 cooling section (277262)

KKC-W-L 062 cooling section (277270)

KKF 30 062-filter-section (93312)

KKS 062 silencer-section (276852)

Documents

Installation, Operation and Maintenance instruction_001

UKCA DECLARATION OF CONFORMITY_MUB_EN_002.PDF

COMMISSIONING REPORT_FANS_160628_EN_001.PDF

Article name: MUB 062 630D4 Multibox | Product link: <https://shop.systemair.com/en-GB/productPermalink?p=522806> | Item Number: 235398 | Variant: 400V 3~ 50Hz - 90° air flow | Document type: Product card | Created at: 22.10.2023 | Generated by: Systemair Online Catalogue | Language: English

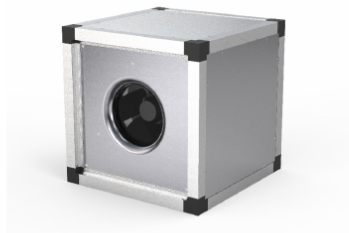
Page 2 of 2

Figure F4: Systemair MUB 062 630D4 Multibox product card page 2, including hydraulic data and octave-band inlet/outlet/surrounding sound power levels used in the assessment.

MUB 062 560D6 Multibox

Article Number: 235436

Variant : 400V 3~ 50Hz - 90° air flow

**Description**

- High efficient motor
- Speed-controllable via frequency converter
- Integral cold conductor (PTC)
- Low sound level
- Flexible airflow direction due to removable panels
- Installation in any mounting position
- Easy to maintain and reliable

The MUB fan are equipped with high efficient motors. The MUB fans have an impeller with backward curved blades, manufactured from aluminum. Speed control is only possible by using a frequency converter. Motor protection is done by cold conductors (PTC), which have to be connected to an external motor protection device. The casing consists of an aluminum frame with fiberglass reinforced plastic...

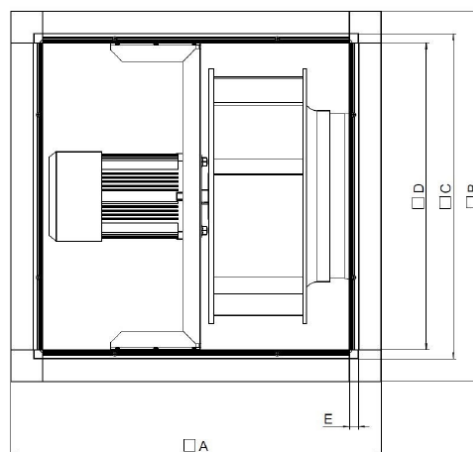
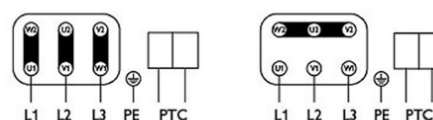
Find more details in our online catalogue

Technical parameters

Nominal data	
Voltage (Nominal)	400 V
Frequency	50 Hz
Phase(s)	3~
Input power	752 W
Input current	1.64 A
Impeller speed	969 r.p.m.
Air flow	max 2.196 m³/s
Temperature of transported air	max 40 °C
Max temperature of transported air, when speed controlled	40 °C
Protection/Classification	
Enclosure class, motor	IP55
Insulation class	F
Data according to ErP	
ErP ready	ErP 2016; ErP 2018
Dimensions and weights	
Weight	86.2 kg
Others	
Motor type	AC

Dimension

MUB 062	☐ A	☐ B	☐ C	☐ D	E
560/630	820	820	720	678	21

**Wiring**
Dreiphasenmotor mit Kaltleiter
 Three phase motor with cold conductor
 Moteur triphasé avec résistance PTC


3 x 230V
D Schaltung
Delta connection
Branchement en triangle

3 x 400V
Y Schaltung
Star connection
Branchement en étoile

Drehrichtungsänderung durch Vertauschen von 2 Phasen
Changing of direction of rotation by interchanging of two phases
Changement de sens de rotation par inversion de deux phases

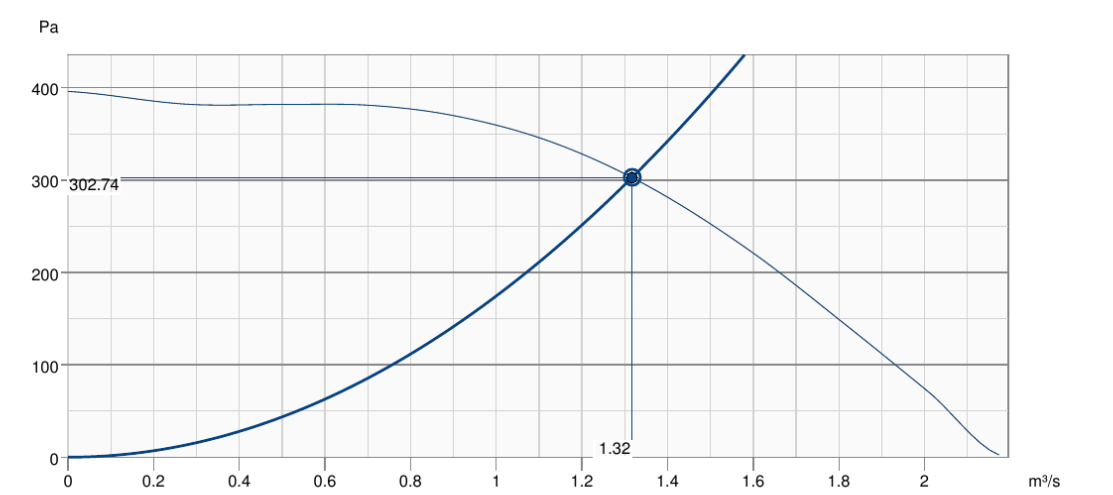
Typenschild beachten! See label! Voir plaque!ette!

Article name: MUB 062 560D6 Multibox | Product link: <https://shop.systemair.com/en-GB/productPermalink?p=522800> | Item Number: 235436 | Variant: 400V 3~ 50Hz - 90° air flow | Document type: Product card | Created at: 05.05.2021 | Generated by: Systemair Online Catalogue | Language: English

Page 1 of 2

Figure F5: Systemair MUB 062 560D6 Multibox product card page 1, identifying the selected fresh-air fan technical data.

Performance curve



Hydraulic data	
Required air flow	1.32 m³/s
Required static pressure	303 Pa
Working air flow	1.32 m³/s
Working static pressure	303 Pa
Air density	1.204 kg/m³
Power	768.5 W
Fan control - RPM	970 rpm
Current	1.66 A
SFP	0.584 kW/m³/s
Control voltage	400.0 V
Supply voltage	400 V

Accessories

FGV 062/716-716 flex. conn. (4198)	FRQ-4A V2 (36227)
FRQ5-4A+LED V2 (36229)	FRQ5S-4A+LED V2 (36233)
FRQ5-4A V2 (36231)	FXDM5AM Frequency inv. IP54 (31387)
REV-5POL/05 ON/OFF (33979)	SD-MUB Vibration pad set (37324)
TUNE-AHU-DE008-062-718x718-M0 (79882)	U-EK230E Motor protection (30199)
UGS 062/630 adapter flex. (4358)	WSD 062 (860x860x70) complete (31482)
WSG 062 MUB complete (31486)	REV-5POL/05 incl. EMC KIT (34549)
SDM Service Door MUB 062 comp. (32573)	CCM inlet MUB062 d560 (311782)
CCM inlet MUB062 d630 (311783)	CCM outlet MUB062 d560 (311684)
CCM outlet MUB062 d630 (311681)	CCMI outlet 062 d560 KIT 30mm (239095)
CCMI outlet 062 d630 KIT 30mm (239096)	RK-MUB-678x678-R (43677)
RK-MUB-678x678-S (43681)	RKT-MUB-678x678-S (43685)

Documents

imo_mub_all_010_en_248056
EU DECLARATION OF CONFORMITY_MUB_EN_[001].PDF
COMMISSIONING REPORT_FANS_160628_EN_001.PDF

Figure F6: Systemair MUB 062 560D6 Multibox product card page 2, including hydraulic data for the selected fresh-air fan.



Unit 10 Gunners Building
 Limberline Road
 Hilsea
 Portsmouth
 PO3 5BJ
 Tel: 02393 200170
 Fax: 02393 541170
 email: sales@airmovementsupplies.co.uk

TYPE R2 ATTENUATOR STATIC INSERTION LOSS

LENGTH MM	HZ / dB							
	63	125	250	500	1000	2000	4000	8000
600	7	12	20	31	39	40	38	27
900	9	16	25	42	50	50	50	41
1200	11	20	34	50	50	50	50	48
1500	13	24	41	50	50	50	50	50
1800	15	30	47	50	50	50	50	50
2100	16	33	50	50	50	50	50	50
2400	20	38	50	50	50	50	50	50

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Figure F7: AMS Type R2 1200 mm attenuator static insertion loss data used for the terminal attenuation calculation.

16.5 Fan casing / screen construction requirement

Item	Minimum specification	Purpose
Acoustic panel/screen / casing treatment	Minimum 50 mm acoustic panel system, proprietary lined enclosure/screen or equivalent casing treatment with protected acoustic lining/perforated internal liner where required.	Reduce casing/breakout noise from roof-mounted EF.01 fan/plant item.
Geometry	Screen/enclosure to interrupt direct line of sight from EF.01 casing/ductwork to the nearest receptor while maintaining airflow and service access.	Avoid breakout path becoming dominant after discharge attenuation.
Required reduction	10, 14, 16, 18, 18, 18, 16, 14 dB from 63 Hz to 8 kHz for fan casing/screening; exposed duct breakout treatment to achieve 4, 6, 9, 10, 10, 10, 8, 6 dB from 63 Hz to 8 kHz.	Acoustic performance criterion.
Verification	Post-installation BS4142 measurement and spectrum analysis.	Confirm compliance and absence of tonal/distinctive features.

17 APPENDIX G - CITATIONS AND REFERENCES

Ref	Citation / reference
R1	Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, 2010.
R2	National Planning Policy Framework, Ministry of Housing, Communities and Local Government, December 2024 as amended February 2025.
R3	BS 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound.
R4	ISO 9613-2:1996, Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.
R5	AVE Ltd drawing C7103-DW-00-001 P01, 97-99 Montague Street, Worthing, Proposed Kitchen Ventilation Layout, May 2026, P01 issue dated 19.05.2026.
R6	Impact Acoustics Ltd background sound measurement data IMP8139-1 DATA.csv, 29 April to 4 May 2026.
R7	User-supplied annotated aerial imagery showing the nearest sensitive receptor, measurement position and source-receptor distances.
R8	Systemair MUB 062 630D4 Multibox product card, Article Number 235398, octave-band inlet/outlet/surrounding sound power data and hydraulic data.
R9	Kerry, G. and Craven, N.J. A Good Practice Guide on the Sources and Magnitude of Uncertainty Arising in the Practical Measurement of Environmental Noise.
R10	AMS Air Movement Supplies, Type R2 Attenuator Static Insertion Loss, 1200 mm length, octave-band insertion loss data.
R11	Post-installation BS 4142 verification survey requirements stated in Sections 8.1, 9, 10 and Appendix B.
R12	Internal cross-reference map: Appendix E assumptions A1-A16 and methodology references C1-C8/M1-M3 are cited in Sections 6 and 7 to show where each input criterion is used in the main body of the report.
R13	Systemair MUB 062 560D6 Multibox product card, Article Number 235436, technical and hydraulic data; Systemair catalogue acoustic information for the same fan type/duty used for octave-band sound power.
R14	Worthing Local Plan 2020-2036, Worthing Borough Council, adopted March 2023, including Policy DM22 - Pollution and Policy DM5 - Quality of the Built Environment.
R15	Adur & Worthing Councils, Noise and Planning guidance, Environmental Health / Development Management web guidance.
R16	Planning Noise Advice Document: Sussex, November 2023.
R17	Planning Practice Guidance: Noise, Ministry of Housing, Communities and Local Government / GOV.UK.

18 DISCLAIMER

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#END OF REPORT#